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CASE REPORT

Coronary Subclavian Steal Syndrome After Left Internal Mammary Bypass in Patient with Takayasu's Disease Treated by Endarterectomy

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Introduction

Coronary subclavian steal has been previously described following left internal mammary artery (LIMA) coronary grafting.[1,2] Stenosis or occlusion of the subclavian artery due to atherosclerosis was the cause in these cases. We report a case of coronary subclavian steal due to a subclavian stenosis in a women with Takayasu's disease, treated surgically.

Case Report

A 62-year-old white woman with angina pectoris was admitted to another institution in 1993. Since 1992 an inflammatory syndrome has been extensively investigated, including two temporal artery biopsies, but no specific diagnosis had been found. Atherosclerotic risk factors were limited to a moderate hypercholesterolemia. Coronary angiography revealed a tight left main stenosis (80%) with a normal left anterior descending (LAD) and normal circumflex (CX) and right coronary arteries. Left ventricular function was normal. A coronary artery bypass (CABG) was performed using a saphenous veinous graft (SVG) on the CX and a LIMA on the LAD. The left subclavian artery was clinically considered to be normal; there was no blood pressure difference between the arms and no supraclavicular murmur.

Eight months later stress angina recurred with a positive exercise test and an anterior defect on thallium angioscintigraphy. At coronary angiography, the left main stenosis remained unchanged and the two bypasses were patent without stenosis. Selective angiography of the left subclavian artery revealed a significant stenosis just before the origin of the LIMA. A diagnosis of Takayasu's disease was suspected as defined by the criteria of the American College of Rhumatology (ACR).[3] Treatment with corticosteroids was started and the anti-angina medication was increased.

The patient remained asymptomatic over the next year, but she was admitted to our institution in 1996 because of unstable angina with rest pain and exercise ischemic pain in the upper extremity and vertebrobasilar insufficiency. The right radial pulse was diminished and the left abolished. Bilateral supraclavicular systolic murmurs were present. A diastolic murmur due to a mild aortic insufficiency was also present at the left sternal border. The exercise test was positive at the 60 Watt load. Arterial duplex imaging demonstrated a left subclavian sub-occlusive stenosis and a reversed blood flow inverted in the LIMA.

Selective coronary angiography showed a significant decrease of the left main stenosis down to 50% and a coronary subclavian steal with complete opacification of the LIMA from the LAD. The saphenous graft was patent without stenosis and the right coronary artery remained normal. Supra-aortic arteriography revealed a tight left vertebral artery stenosis (80%) and a very

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tight stenosis of the subclavian artery between the vertebral artery and the LIMA . The subclavian artery beyond the LIMA was occluded and the left axillary artery was perfused via a collateral from the thyrocervical trunk. A 65% stenosis was observed in the right subclavian artery.

The patient was treated surgically and a subclavian, vertebral and internal mammary endarterectomy with a reversed saphenous vein graft from the subclavian to the axillary artery were performed. The adventitia and intima were thickened with peri-adventitial inflammation. No atherosclerotic lesions were observed. Microscopic analysis of the subclavian artery revealed non-specific inflammatory lesions.

At 18 months' follow-up, the patient remains asymptomatic for angina, arm claudication and vertebal symtoms. The excercise test is negative at 80% of the upper limit rate.

Discussion

Takayasu's arteritis is a chronic inflammatory process of unknown aetiology, usually involving the large arteries arising from the aortic arch and their branches, especially the subclavian and carotid arteries. In Takayasu's disease, coronary artery involvement was reported to be 7% by coronary angiography or necropsy findings. Coronary lesions are ostial on the left main or the right artery in 50 to 60% of cases.[4] Successful surgical treatment including CABG or patch angioplasty has been reported.[5] A consistent finding from the literature seen in this report is the decrease of the left main stenosis after corticosteroid treatment.[6]

Recurrence of angina after sucessful CABG may be related to the progression of the atherosclerotic disease into the native vessels or graft disease, especially in the SVG. LIMA is widely used for LAD revascularisation because of good symptomatic relief and the better long-term patency rate. LIMA graft dysfunction may be caused either by distal anastomosic stenosis or unusually by a coronary SC steal through a patent LIMA secondary to atherosclerotic lesions.[1] CABG with a LIMA renders the coronary artery dependent on the blood flow to the subclavian artery, so that a subclavian artery stenosis can lead to myocardial ischaemia. Signs or symptoms of subclavian stenosis include arm claudication, vertebrobasilar insufficiency, a supra-clavicular murmur and diminished arm pulses. If any of these symptoms are associated with myocardial ischemia after LIMA bypass, a significant stenosis of the proximal subclavian artery must be considered. The reported incidence of coronary subclavian steal after LIMA is estimated to be 0.5%–1.1%.[2]

In this report the coronary subclavian steal is not due to an atherosclerotic lesion but to an inflammatory lesion involving the vertebral artery as well, thus explaining the three distinct symptoms. Although the microscopic findings were not specific of Takayasu's disease, the patient responded to corticosteroid treatment for 1 year, and the diagnosis was established according to the ACR criteria.

In patients with suspected Takayasu's arteritis the optimal treatment of coronary lesions is questionable: are the stenoses fixed or corticosteroid dependent? The choice of grafts is also debatable: the risk of development of stenotic lesions in the subclavian artery is a problem for LIMA and implantation of SVG on the aorta is sometimes difficult due to the inflammatory lesions of the aortic wall.[5]

Surgery in various forms, including carotid-subclavian bypass, balloon angioplasty, endarterectomy or stent implantation have all been performed[7–9] for subclavian stenosis. In all cases involving the percutaneous approach, the subclavian stenosis were short and isolated, not involving the collateral branchs and located proximal to the origin of the vertebral artery. The success rate is high (80–93%) but long-term efficacy is not proven.[8,9] Not all the lesions treated were inflammatory. In our patient angioplasty was not possibe because of the vertebral stenosis and the distal occlusion of the SC artery, as well as the aetiology of the lesion. The success rate and long-term follow-up are not well established for this appraoach in Takayasu's disease.[10]

In our patient the location of the stenosis, involving the vertebral artery and the total occlusion of the subclavian, did not allow for the performance of a carotid-subclavian bypass. The surgical technique used was a subclavian, vertebral and internal mammary endarterectomy and a reversed saphenous vein graft from the subclavian to the axillary artery allowing the treatment of the three different lesions.

Conclusions

All patients undergoing CABG should be carefully screened before surgery. Preoperative evaluation should include history and clinical examination. A blood pressure difference of 20% between the two arms or a supraclavicular murmur suggest a potentially significant subclavian artery stenosis. An arch aortogram is highly recommended or at the very least a supra-aortic arterial Doppler. This approach must be more systematic in patients with unexplained inflammatory syndromes and especially in suspected Takayasu's disease.

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